



Province of the
EASTERN CAPE
EDUCATION

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NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2024

AGRICULTURAL SCIENCES P1

MARKS: 150

TIME: 2½ hours

This question paper consists of 18 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. You may use a non-programmable calculator.
6. Show ALL your calculations, including formulae, where applicable.
7. Write neatly and legible.

SECTION A**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Structures in the wall of the small intestine that increase the absorption surface.

- A Papillae
- B Caruncles
- C Villi
- D Lieberkühn gland

1.1.2 The ... of the stomach of a cow is sometimes referred to as the 'hardware stomach', because it is where foreign objects such as wire are lodged.

- A abomasum
- B omasum
- C rumen
- D reticulum

1.1.3 Ideal conditions for microbial activity.

- (i) Anaerobic conditions
- (ii) Removal of waste products
- (iii) Low temperatures
- (iv) Slightly acidic medium

Choose the CORRECT combination:

- A (i), (ii) and (iii)
- B (i), (iii) and (iv)
- C (i), (ii) and (iv)
- D (ii), (iii) and (iv)

1.1.4 The following are products of cellulose digestion, except ...

- A oxygen.
- B vitamin B complex.
- C methane.
- D volatile fatty acids.

1.1.5 Factors that increase animal production under intensive farming.

- (i) Cultivar
- (ii) Nutrition
- (iii) Reproduction
- (iv) Management

Choose the CORRECT combination:

- A (i), (ii) and (iii)
- B (i), (iii) and (iv)
- C (i), (ii) and (iv)
- D (ii), (iii) and (iv)

1.1.6 The facility used to control ticks in the illustration below, is called a ...



- A spray dip.
- B plunge dip.
- C pour-on dip.
- D foot dip.

1.1.7 Sign that a bull is NOT in distress.

- A Pawing
- B Snorting
- C Rapid tail movements
- D Grazing with other cattle

1.1.8 A flight zone of a cow is a space ...

- A around it.
- B in front of its head.
- C close to its tail.
- D between the horns.

1.1.9 Lactating dairy cows should be fed a ... ration.

- A maintenance
- B production
- C maintenance and production
- D maintenance and nutritive

1.1.10 The correct order of development of spermatozoa:

- A Spermatogonium → primary spermatocyte → secondary spermatocyte → spermatids
- B Spermatogonium → primary spermatocyte → spermatids → secondary spermatocyte
- C Spermatogonium → secondary spermatocyte → spermatids → primary spermatocyte
- D Primary spermatocyte → secondary spermatocyte → spermatogonium → spermatids (10 x 2) (20)

- 1.2 Indicate whether the descriptions in COLUMN B apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN A. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

COLUMN A			COLUMN B
1.2.1	A: B:	Protozoa and bacteria Fungi and virus	Beneficial micro-organisms in the rumen of cattle
1.2.2	A: B:	1 : 7,25 1 : 6,25	The nutritive ratio of a feed with total digestible nutrients (TDN) of 75% and a DP of 12%
1.2.3	A: B:	Wood shavings Grass straw	Material used for bedding in chicken houses
1.2.4	A: B:	Intramuscular Intravenous	Injection introduced directly into the vein
1.2.5	A: B:	Viable pH should be 5,4–5,9	Characteristic of a good semen

(5 x 2) (10)

- 1.3 Give ONE word/term for EACH of the following descriptions. Write only the word/term next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

1.3.1 A property of vitamins that is used to classify them into two main groups

1.3.2 Non-contagious diseases caused by nutritional deficiencies

1.3.3 Fluid that protects the embryo against shock

1.3.4 Protrusion of the vagina through the vulva

1.3.5 Milk secreted for the first three days after parturition (5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in EACH of the following statements to make them TRUE. Write only the correct answer next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Nutritive ratio is a measure of the quality of a protein in a feed.

1.4.2 Mosquitos attack open wounds and insect bites in the tail area of sheep breeds.

1.4.3 Hypoplasia describes a condition when the testicles do not descend into the scrotum.

1.4.4 Monozygotic twins develop from two different ova released during ovulation, that are fertilised by two different spermatozoa.

1.4.5 Dry period is a period of milk production starting after parturition and lasting about 305 days in cows. (5 x 1) (5)

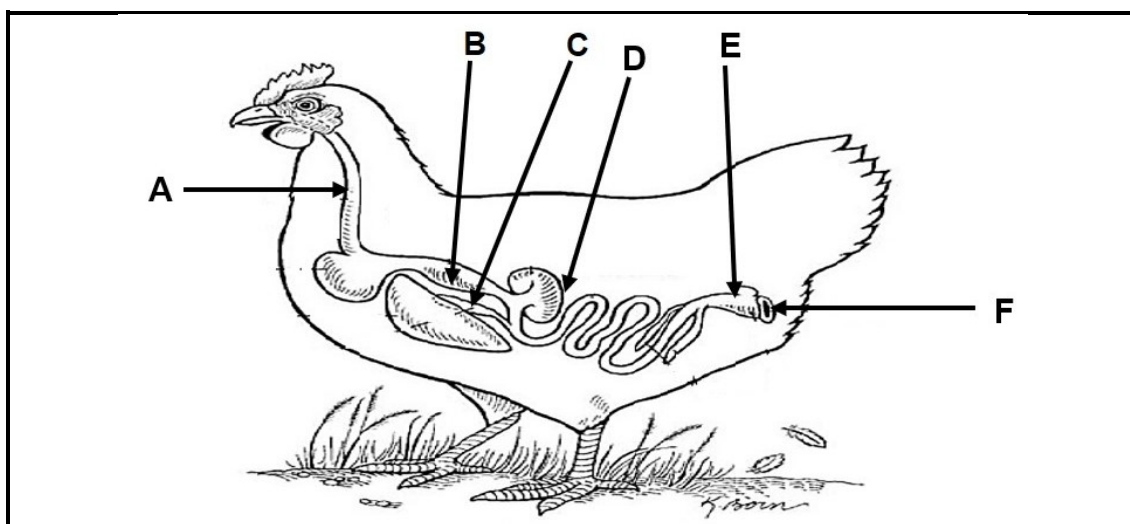
TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 Study the diagram below and answer the questions that follow.



2.1.1 Classify the farm animal in the diagram above based on its alimentary canal. (1)

2.1.2 Identify the LETTER of the part in the diagram above where the following occurs:

- (a) Contains a substance that assists in the absorption of fatty acids and glycerol (1)
- (b) Common opening for the digestive and excretory systems (1)
- (c) Corresponds with the true stomach of a sheep (1)
- (d) Characterised by masculine walls for mechanical digestion (1)

2.2 Animals get their nutrients from proteins, carbohydrates, lipids and vitamins they consume. Minerals also form part of the diet and are needed in different quantities. Animals need rations with all these components in the correct proportions.

2.2.1 Identify the feed component that is classified as inorganic in the passage above. (1)

2.2.2 Identify the feed component with the function below:

- (a) Stored in the form of glycogen in the liver (1)
- (b) Required for growth, reproduction and production (1)

2.2.3 Name the type of nutrient uptake which uses carrier molecules. (1)

2.2.4 Indicate the vitamin / mineral or deficiency symptom represented by the letters in the table below. Do NOT redraw the table. Write only the correct answer next to the letter. (3)

VITAMIN/MINERAL	FUNCTION	DEFICIENCY SYMPTOMS
A	Blood clotting	Poor blood clotting in chickens
Phosphorus	Healthy bones and teeth	B
C	Formation of haemoglobin	Anaemia

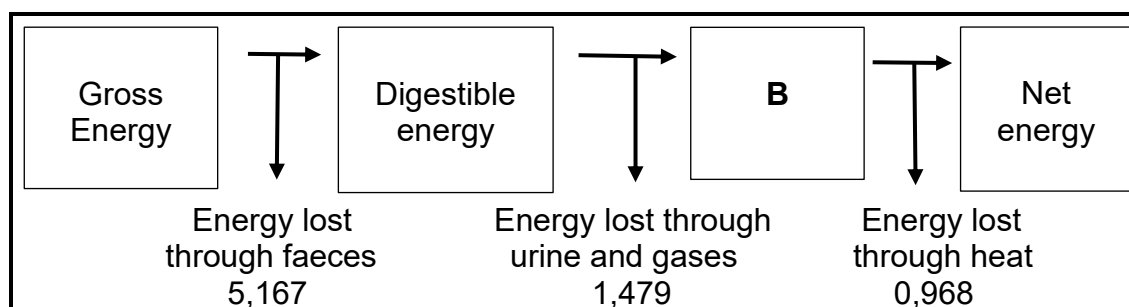
2.3 The value of the feed is determined by calculating its digestibility co-efficient. In a feed trial, a cow ingested 15 kg of dry hay and excreted 6 kg of faeces with a moisture content of 50%.

2.3.1 Calculate the digestibility co-efficient of the hay. Show ALL calculations. (5)

2.3.2 Briefly interpret the digestibility co-efficiency obtained above. (1)

2.3.3 Suggest TWO factors that might have influenced the digestibility of hay. (2)

2.4 A sheep consumes 1 kg dry matter daily from a formulated feed, with a gross energy value of 15,648 MJ/kg DM. The flow chart below shows the energy losses (MJ/kg DM).



2.4.1 Indicate the energy represented by **B**. (1)

2.4.2 Calculate the nett energy the sheep would get from the daily ration. (3)

2.4.3 Interpret the calculation in QUESTION 2.4.2 above. (1)

2.5 The data below relates to the fodder flow plan for a period of six months.

FORAGE	Yield (ton/ha)	Area (ha)	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	DM Sum (tons)
Veld	2,19	40				10	10	20	40
Forage sorghum	12	25					43	30	73
Lucerne	15	15	40	35	52	46	15	30	
Total feeds (t)			40	35	52	56	68	80	
Shortage (t)			11	14	-	-	-	-	25
Surplus (t)			-	-	-	7	15	30	52
Livestock requirements (t)			51	49	52	49	53	50	

2.5.1 Draw a bar graph to compare the total feeds and livestock requirements for July to December. (6)

2.5.2 Calculate the surplus in the month of December in kg. (2)

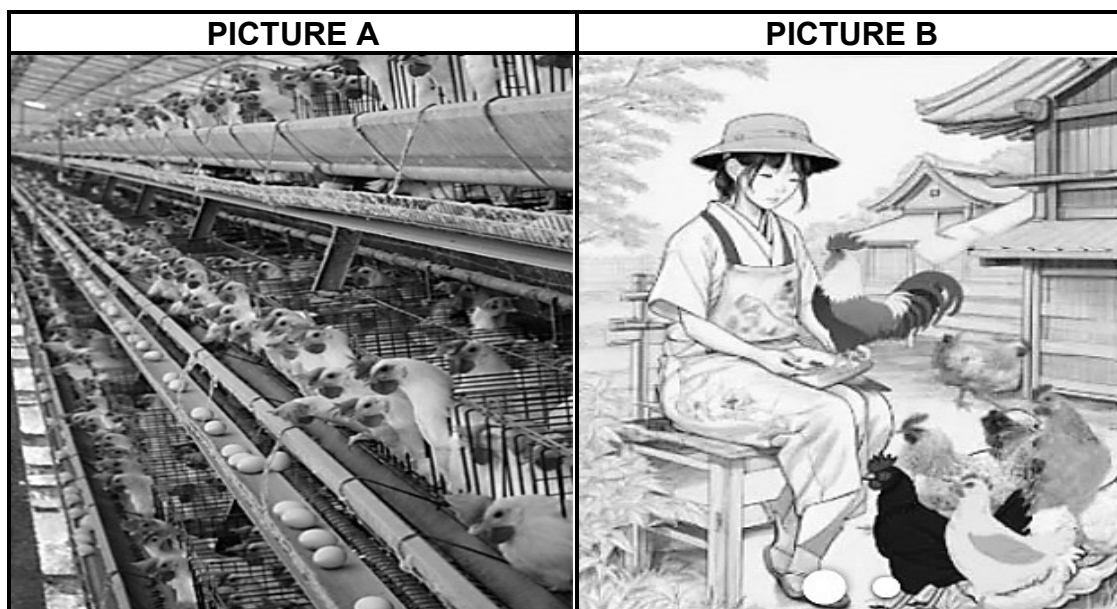
2.5.3 Suggest TWO cost-effective measures a farmer can implement to deal with the surplus in the month of December. (2)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The pictures below show farming systems in agriculture.



3.1.1 Identify the farming system depicted in PICTURE B. (1)

3.1.2 Indicate the purpose of the farming system mentioned in QUESTION 3.1.1 above. (1)

3.1.3 Hypothesize on the productivity of the farming system in PICTURE A. (1)

3.1.4 Describe how the factors below are used to increase production in extensive farming production.

(a) Reproduction (1)

(b) Nutrition (1)

3.2 Recommend a facility that can be used for the following purposes:

3.2.1 To increase temperature in a furrowing pen (1)

3.2.2 Maintain the temperature inside a housing structure (1)

3.2.3 For poultry feeding (1)

3.3 All farm animals are homeothermic. A portion of the feed taken in by an animal is used to keep the animal warm, while the remainder is used for essential life processes. Extreme temperatures may impact negatively on the energy available for these processes.

3.3.1 Define the underlined word in the passage. (2)

3.3.2 Suggest ONE way a farmer can protect farm animals from extremely high temperatures in an extensive production system. (1)

3.3.3 Explain the relationship between feed intake, water intake and farm animal productivity under extremely high temperatures. (3)

3.4 The picture below shows part of an animal handling facility.

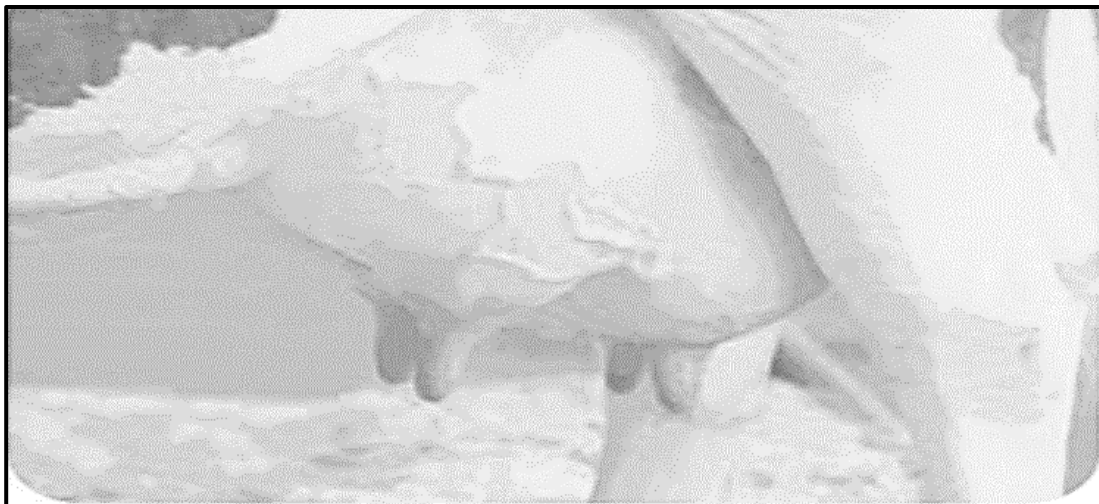


3.4.1 Name the pen in the picture above. (1)

3.4.2 Recommend TWO design features that a farmer needs to consider when designing the facility. (2)

3.4.3 Mention ONE use of the facility above. (1)

3.5 The picture below shows an infected udder.



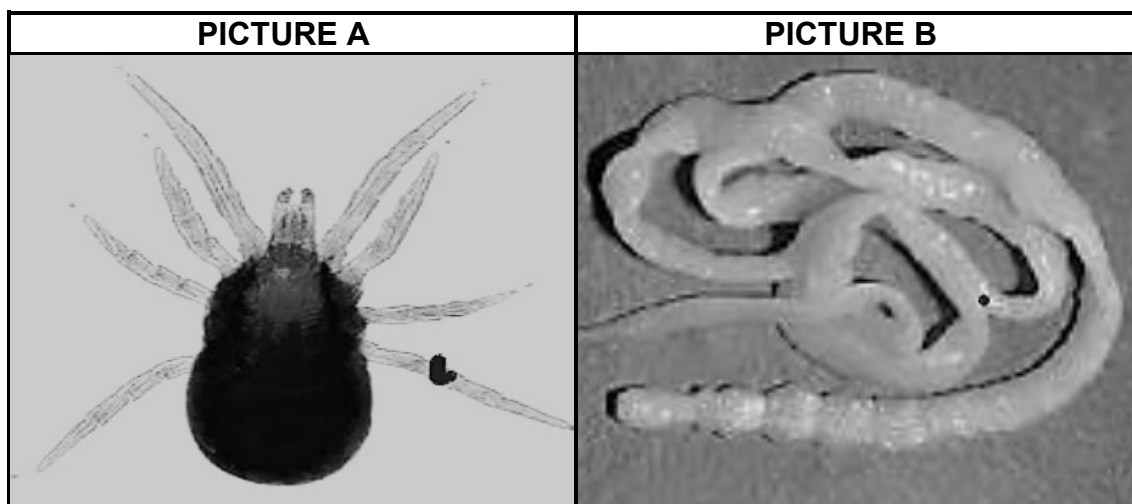
3.5.1 Identify the disease affecting the udder of a cow as shown in the picture above. (1)

3.5.2 Classify the disease mentioned in QUESTION 3.5.1 above based on a causative pathogen. (1)

3.5.3 Give TWO symptoms an animal displays when infected by the disease. (2)

3.5.4 Describe TWO economic implications of the disease to a farmer. (2)

3.6 The pictures below show parasites that attack livestock.



3.6.1 Classify the parasites in PICTURES A and B. (2)

3.6.2 Name the disease caused by the microscopic parasite in PICTURE A. (1)

3.6.3 List TWO symptoms of the disease mentioned in QUESTION 3.6.2. (2)

3.6.4 State TWO control measures for the parasite in PICTURE B. (2)

3.7

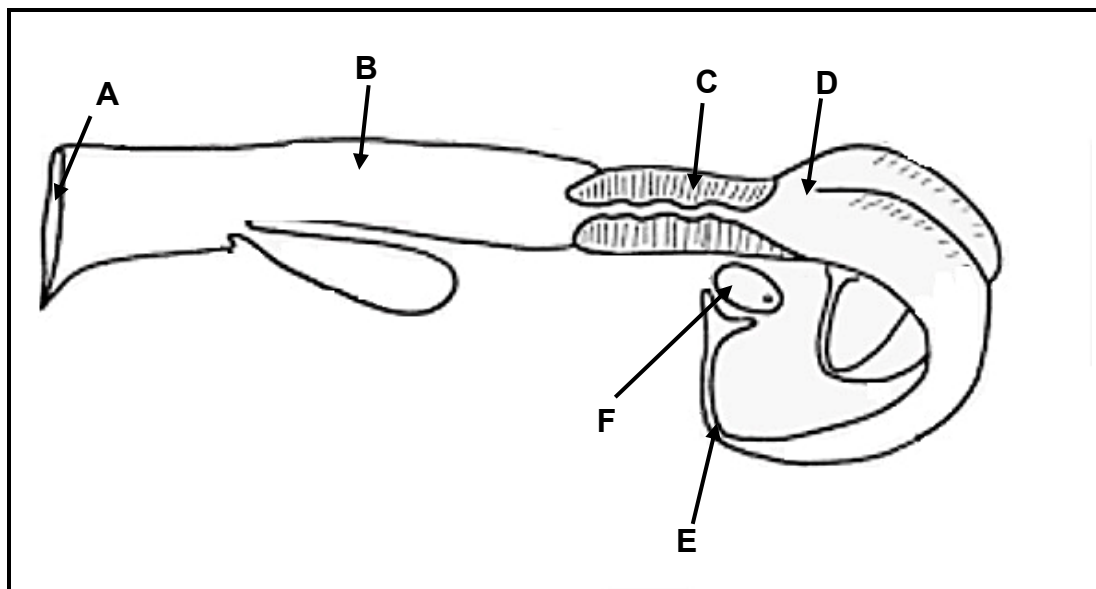
Salt is one of the essential minerals needed by all animals that is usually lacking in the diet of grazing farm animals. Salt is often mixed with concentrates to make a mineral lick for grazing cattle. Under certain conditions, the consumption of large amounts of salt may be fatal to livestock. Excessive salivation, constipation and increased thirst are evident. Mortalities may occur where there is a high concentration of salt in the drinking water, or there is a shortage of drinking water.

- 3.7.1 Identify TWO common salt poisoning symptoms, from the passage, that can be noticed in farm animals. (2)
- 3.7.2 Provide ONE preventative measure for salt poisoning. (1)
- 3.7.3 Give ONE role of the state in animal protection. (1)
- [35]**

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The diagram below shows the reproductive organs of cattle.



4.1.1 Identify the farm animal with the reproductive system above. (1)

4.1.2 Name the parts labelled **B** and **E**. (2)

4.1.3 Indicate by writing only the LETTER corresponding to the part where the following occurs:

(a) Produces oocytes (1)

(b) Protects the uterus from the external environment (1)

4.2 The oestrus cycle is a hormonally controlled cycle of sexual activity in cows. It is characterised by four stages, namely pro-oestrus, oestrus, met-oestrus and di-oestrus.

4.2.1 Indicate the period of the cycle that is characterised by the formation of the corpus luteum. (1)

4.2.2 Name the hormone that is responsible for ovulation during the period mentioned in QUESTION 4.2.1 above. (1)

4.2.3 Define the underlined word in the passage above. (2)

4.2.4 Give TWO methods of identifying cows on heat. (2)

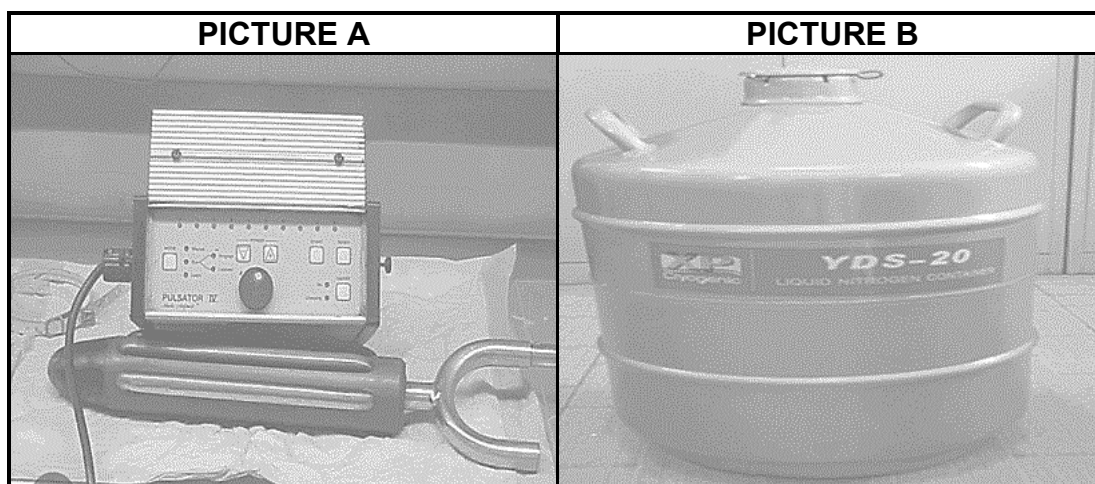
4.3 The picture below shows one of the stages of mating in cattle.



4.3.1 Indicate the mating stage displayed in the picture above. (1)

4.3.2 Identify TWO factors that regulate mating behaviour in bulls. (2)

4.4 The equipment below is used by livestock farmers in animal reproduction.



4.4.1 Name the equipment in PICTURE A. (1)

4.4.2 Indicate the use of the equipment mentioned in QUESTION 4.4.1. (1)

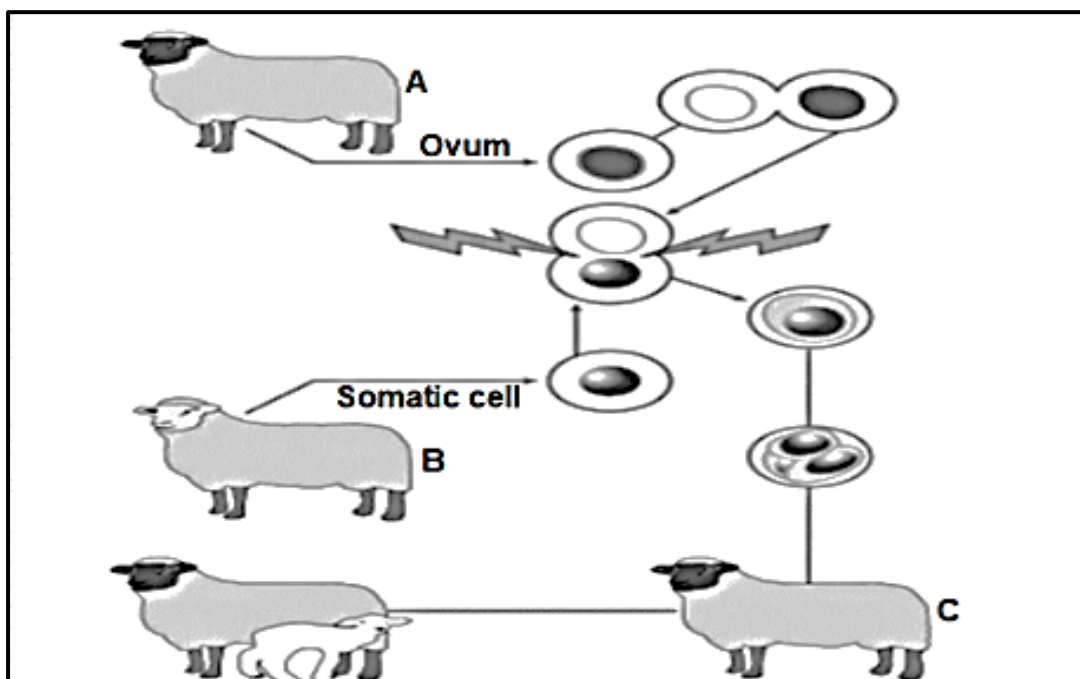
4.4.3 State the temperature at which semen is stored in the equipment shown in PICTURE B. (1)

4.4.4 Describe the functions of the semen dilutants below:

- (a) Buffers (1)
- (b) Egg yolk (1)
- (c) Antibiotics (1)

4.4.5 Briefly explain the correct timing of artificial insemination. (2)

4.5 The diagram below shows a modern animal reproduction technique.



4.5.1 Identify the procedure in the diagram above. (1)

4.5.2 Name animal **C** in the procedure mentioned in QUESTION 4.5.1. (1)

4.5.3 Assess the suitability of the reproductive technique mentioned in QUESTION 4.5.1 for use by subsistence farmers. (1)

4.5.4 Justify your answer to QUESTION 4.5.3 above. (1)

4.6 Below is a picture that shows an important stage in animal reproduction.



4.6.1 Identify the process depicted in the picture. (1)

4.6.2 Indicate the condition which may interfere with the process above. (1)

4.6.3 Name TWO causes of the condition mentioned in QUESTION 4.6.2. (2)

4.6.4 Below are phases of reproduction in cows. Arrange the phases chronologically in order. Write ONLY the letter.

- A Parturition
- B Conception
- C Gestation
- D Fertilisation
- E Ejaculation

(5 x 1) (5)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150